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Job No.: CTCE/BBMP/W.No.05/GR/WMM/Gradation/2015-16

21.03.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Mr. Gopi Reddy,** Contractor, Bangalore.

Name of Work : Improvements to Road and Drains at Jakkur Circle to Hindu Graveyard in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/298/2015-16 Dated: 19.03.2016

Date of Testing : 21.03.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **7180**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	230	230	3.2	96.8	95-100
22.4	2515	2745	38.2	61.8	60-80
11.2	1210	3955	55.1	44.9	40-60
4.75	985	4940	68.8	31.2	25-40
2.36	680	5620	78.3	21.7	15-30
0.600	655	6275	87.4	12.6	8-22
0.075	625	6900	96.1	3.9	0-8

Note:

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ಸಹಾಯಕ ಕಾರ್ಯನಿರ್ವಾಹಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
ಬೆಂಗಳೂರು-24

AE-05
ಸಹಾಯಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ

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Job No.: CTCE/BBMP/W.No.05/GR/WMM/Gradation/2015-16

21.03.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Mr. Gopi Reddy,** Contractor, Bangalore.

Name of Work : Improvements to Road and Drains at Jakkur Circle to Hindu Graveyard in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/298/2015-16 Dated: 19.03.2016

Date of Testing : 21.03.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **7080**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	230	230	3.2	96.8	95-100
22.4	2250	2480	35.0	65.0	60-80
11.2	1185	3665	51.8	48.2	40-60
4.75	1020	4685	66.2	33.8	25-40
2.36	785	5470	77.3	22.7	15-30
0.600	695	6165	87.1	12.9	8-22
0.075	535	6700	94.6	5.4	0-8

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Job No.: CTCE/BBMP/W.No.05/GR/WMM/Gradation/2015-16

22.03.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Mr. Gopi Reddy,** Contractor, Bangalore.

Name of Work : Improvements to Road and Drains at Jakkur Circle to Hindu Graveyard in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/298/2015-16 Dated: 19.03.2016

Date of Testing : 22.03.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **7945**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	160	160	2.0	98.0	95-100
22.4	2650	2810	35.4	64.6	60-80
11.2	1210	4020	50.6	49.4	40-60
4.75	1180	5200	65.4	34.6	25-40
2.36	855	6055	76.2	23.8	15-30
0.600	800	6855	86.3	13.7	8-22
0.075	710	7565	95.2	4.8	0-8

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Job No.: CTCE/BBMP/W.No.05/GR/WMM/AIV/2015-16 21.03.2016

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. Gopi Reddy,** Contractor, Bangalore.
Name of the Work	Improvements to Road and Drains at Jakkur Circle to Hindu Graveyard in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/298/2015-16 Dated: 19.03.2016
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	21.03.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	388	389	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	88	89	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	300	
4	Aggregate Impact value = percent fines	22.68	22.88	
	100* (W_2/W_1)%			22.78

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.05/GR/WMM/S-T/2015-16 21.03.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. Gopi Reddy,** Contractor, Bangalore.
Name of Work	Improvements to Road and Drains at Jakkur Circle to Hindu Graveyard in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/298/2015-16 Dated: 19.03.2016
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	21.03.2016

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **11.58%**

Elongation Index = **13.06%**

Result : Combined Flakiness & Elongation index 24.64%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.05/GR/SDBC/AIV/2015-16 24.03.2016

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. Gopi Reddy,** Contractor, Bangalore.
Name of the Work	Improvements to Road and Drains at Jakkur Circle to Hindu Graveyard in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/298/2015-16 Dated: 19.03.2016
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	24.03.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	379	380	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	78	79	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	301	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	20.58	20.79	**20.68**

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.05/GR/SDBC/Shape_T/2015-16 : 24.03.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	: **Mr. Gopi Reddy,** Contractor, Bangalore.
Name of Work	: Improvements to Road and Drains at Jakkur Circle to Hindu Graveyard in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/E-PMT/298/2015-16 Dated: 19.03.2016
Technical Reference	: IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 24.03.2016

Result : Flakiness Index = **11.52%**

Elongation Index = **13.90%**

Result : Combined Flakiness & Elongation index **25.42%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.05/GR/SDBC/Stripping/2015-16 24.03.2016

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer, B**yatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. Gopi Reddy,** Contractor, Bangalore.
Name of the work	Improvements to Road and Drains at Jakkur Circle to Hindu Graveyard in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/298/2015-16 Dated: 19.03.2016
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	24.03.2016

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.2	3.30	96.70
2	3.3		
3	3.4		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.05/GR/SDBC/Sp_Wa/2015-16 24.03.2016

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. Gopi Reddy,** Contractor, Bangalore.
Name of the Work	Improvements to Road and Drains at Jakkur Circle to Hindu Graveyard in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/298/2015-16 Dated: 19.03.2016
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	24.03.2016

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2024	2025	2026	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1269	1270	1271	
4	Weight of saturated surface dry aggregate in air	W_3 g	2014	2015	2016	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	745	745	745	
6	Weight of oven dried aggregate	W_4 g	2000	2001	2002	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.685	2.686	2.687	2.686
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.736	2.737	2.739	2.737
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.70%	0.70%	0.70%	0.70%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/W.No.05/GR/SDBC/Bitumen/2015-16 24.03.2016

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS2386 and IRC:SP:11-1984

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
AGENCY	**Mr. Gopi Reddy,** Contractor, Bangalore.
NAME OF THE WORK	Improvements to Road and Drains at Jakkur Circle to Hindu Graveyard in Ward No.05, Byatarayanapura Sub Division, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-PMT/298/2015-16 Dated: 19.03.2016
SAMPLE I/D	Roads in Jakkur Circle to Hindu Graveyard in Ward No.05, BBMP, Bangalore.
DATE OF TESTING	24.03.2016

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475	474
3. Weight of Asphalt and Mineral matter Extracted,	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25	26.00
7. Bitumen content in %	5.00	5.20
8. Average	**5.10**	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	33.1	6.97	6.97	93.03	90-100
4.75	242.9	51.14	58.11	41.89	35-51
2.36	38.56	8.12	66.22	33.78	24-39
1.18	42.36	8.92	75.14	24.86	15-30
0.3	43.58	9.17	84.32	15.68	9-19
0.075	55.32	11.65	95.96	4.04	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	31.29	6.26	6.26	93.74	90-100
4.75	262.3	52.46	58.72	41.28	35-51
2.36	56.36	11.27	69.99	30.01	24-39
1.18	46.35	9.27	79.26	20.74	15-30
0.3	38.25	7.65	86.91	13.09	9-19
0.075	40.22	8.04	94.95	5.05	3-8

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